

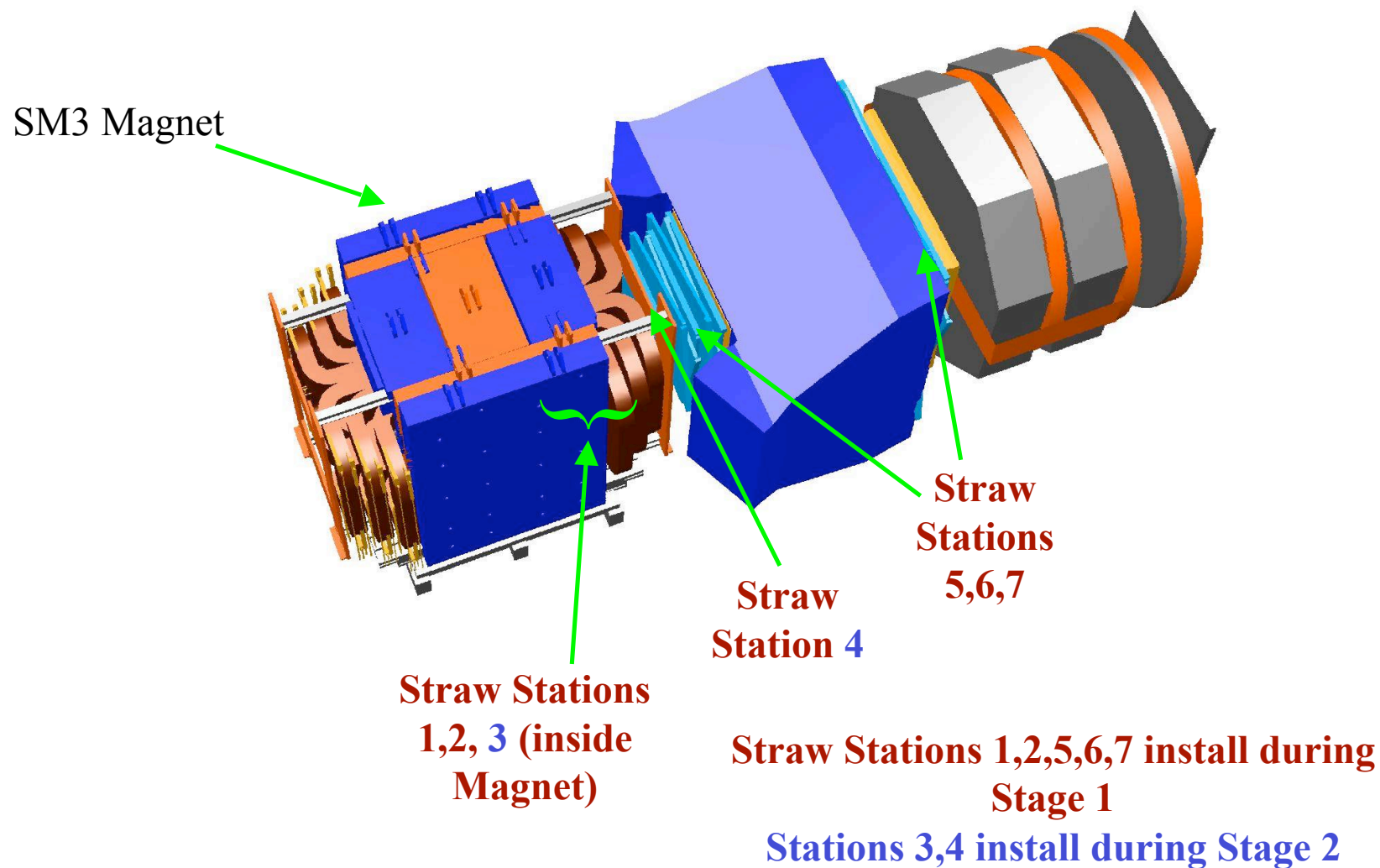
Straw Cost and Schedule

Alan Hahn

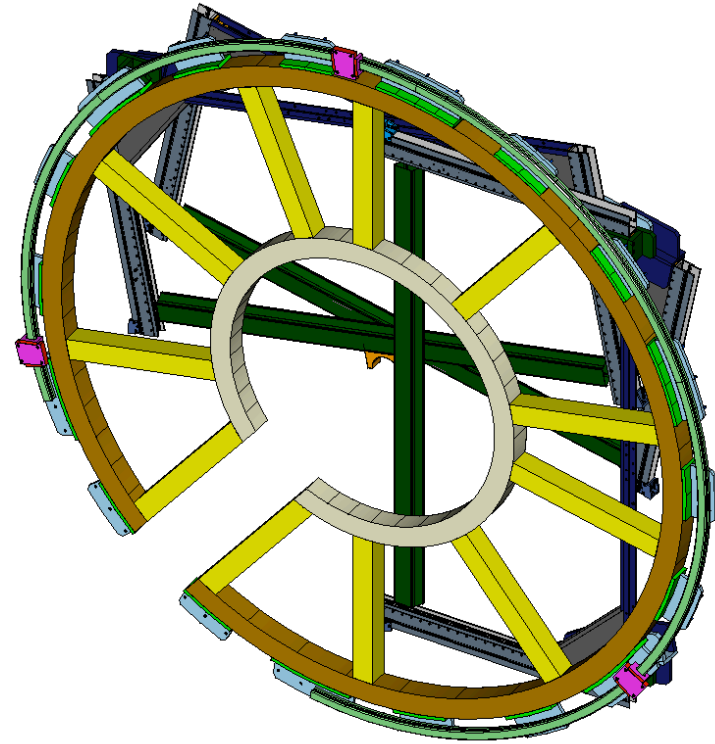
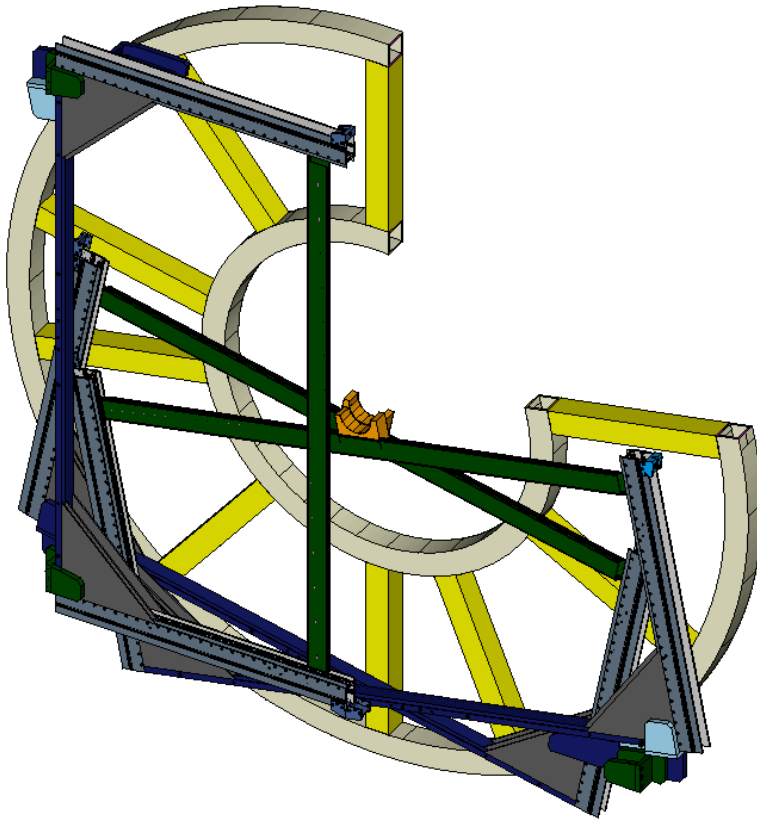
Staged Schedule

Stations 1,2,5,6,7 are installed in stage 1 (Aug-Sept.09),
Stations 3,4 in stage 2 (July 2010)

BTeV Detector



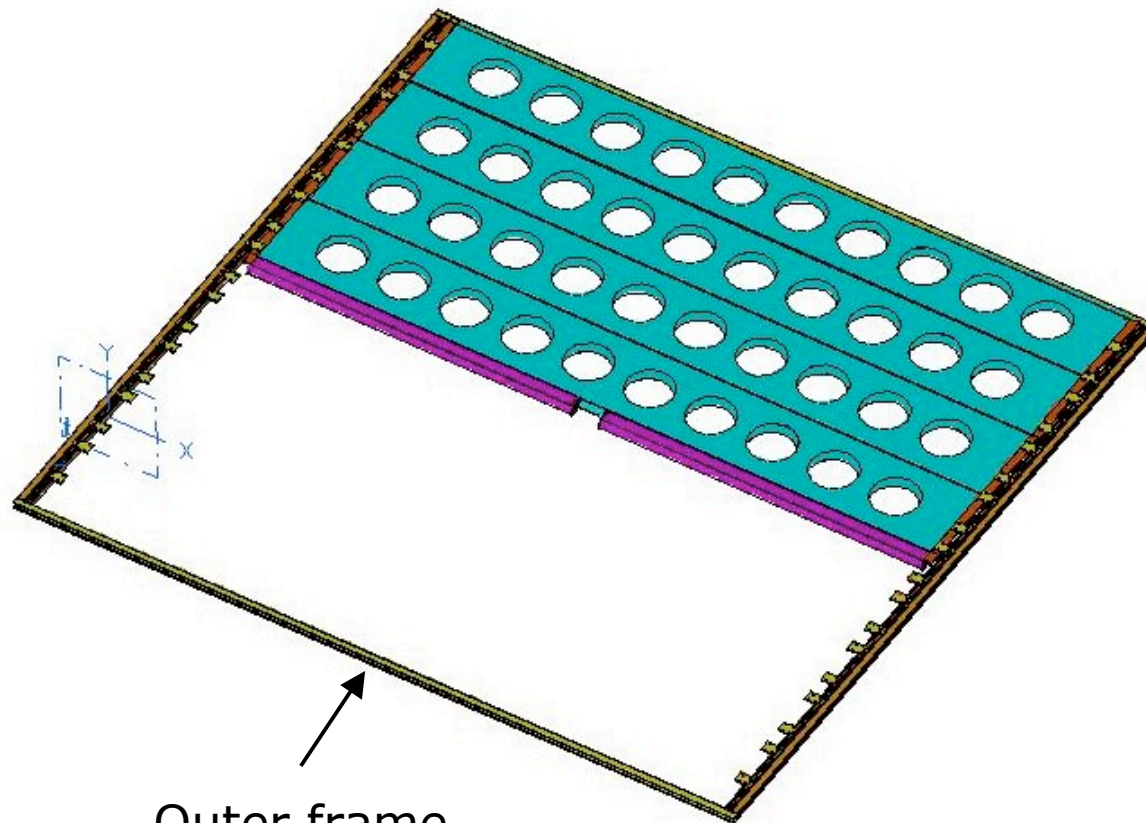
Left Half Straw Station#4
(with Back Plate 2)



Right Half Straw Station#4
(with Back Plate)

Point is that Stations 1-6 install as a group of Views (X,U,V)

BTeV
C0 Station 7 – View Outer Frame (One VIEW)



Outer frame

- Super-module attached at ends to Outer Frame
- Outer Frame supports and aligns super-modules
- Each Outer frame supported individually from above by connecting rods

Straw “Float” Table

1	2	3	4
Station #	Lehman CD1 float	Current non-staged float	Current staged float
1	266 d	373 d	nc
2	226 d	366 d	nc
3	396 d	364 d	549 d
4	281 d	357 d	542 d
5	46 d	347 d	nc
6	344 d	335 d	nc
7 U	124 d	352 d	nc
7 V	124 d	289 d	nc
7 X	124 d	218 d	nc

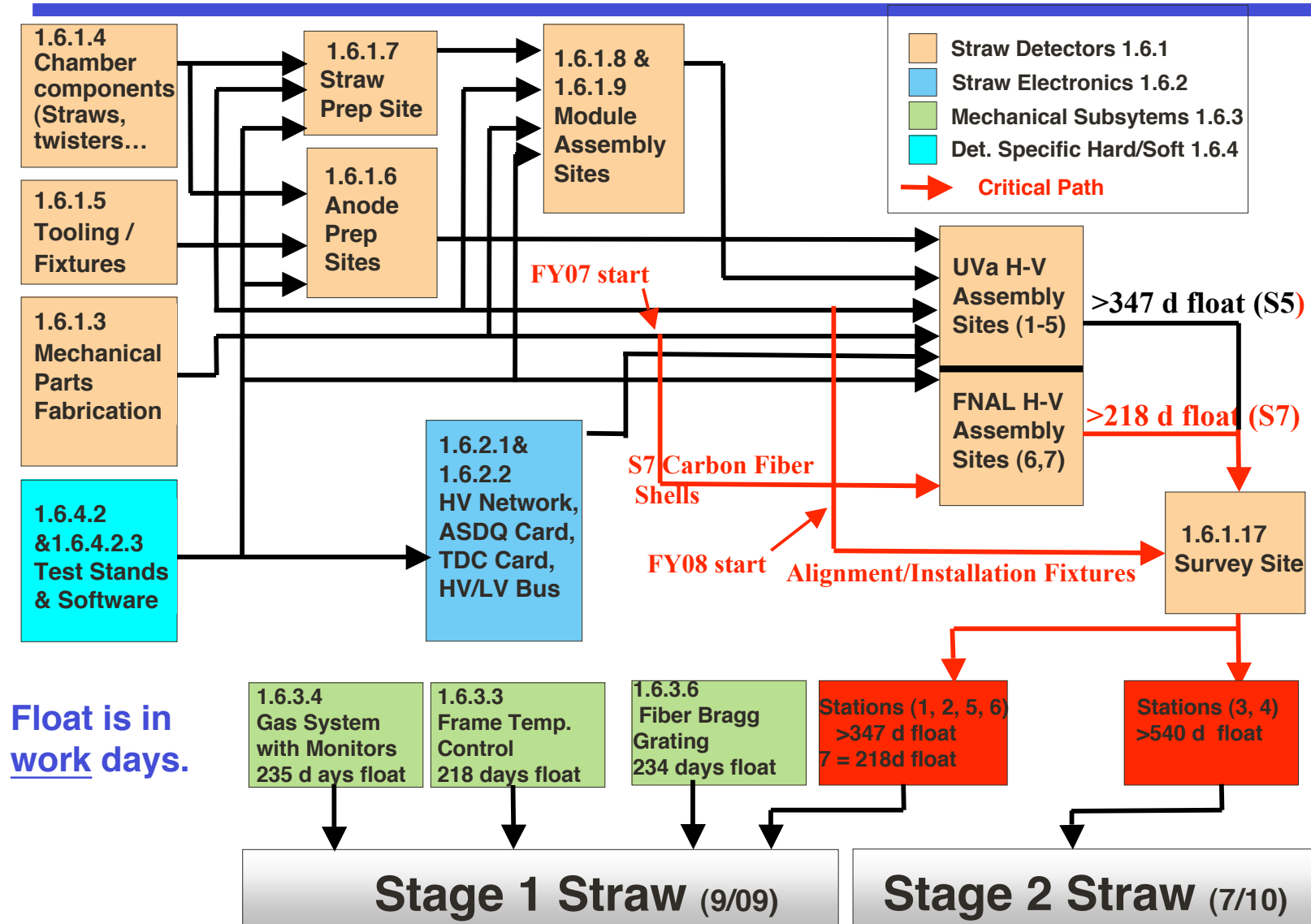
Table 1. Float for Subproject 1.6 under various scenarios. The station production order for the Lehman CD1 Review was Stations (3, 4, 1, 2, 5) (UVa), and Stations (6, 7) (FNAL). For the other columns, the order of station production for UVa was changed to Stations (3, 1, 2, 4, 5) (UVa). All “days” are working days.

Staged Schedule--What have I done?

- Have checked the “Choke-Point” Linkages (Front end electronics for example which gave the 46 day float in Lehman Review)
 - Discovered that the linkage produced an artificial schedule delay
 - Why wait for FE boards before starting to build the first stations?
 - This gave ~100day wait!
 - Changed linkage so that we only require the board production to have started before we start producing the first stations. There will be FE boards a-plenty before we would be at a stage to actually need them.
 - Shouldn't have affected the Cost Profile before Fy2007
 - Will affect FY2007 + since we are actually making things

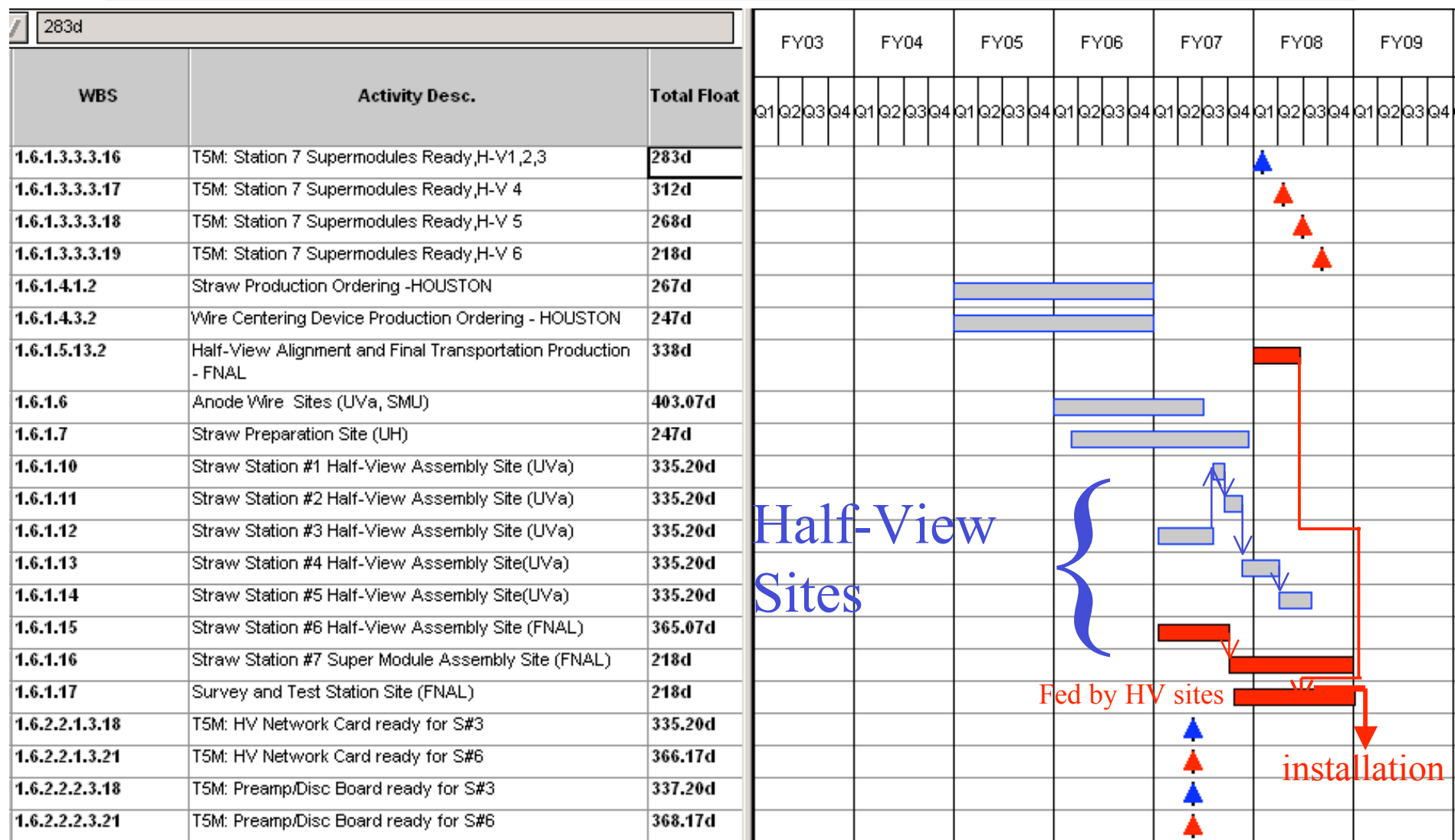
~~BTeV~~ Co Staged Schedule--What have I done? (con't)

- Have changed the number of assembly lines from 2 to 3 (UVa and FNAL).
 - Need more stringing setups, so small effect in FY2006
 - Lowers Station durations by 2/3.
 - Increases labor costs in FY2007 and FY2008
 - Stations are basically “done” by beginning FY2009
 - Have put in new J. Howell- head, Installation Task WBS 1.10- need-by-dates
 - Sept 28 2009 for Stations 1,2,6
 - Oct 05 2009 for Stations 5
 - Aug 24 2009 for Station 7
 - July 1 2010 for Stations 3,4
 - ASDQ procurement moved to FY2006
 - FY2005 is “Pixel Critical”
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Float is in
work days.

WBS 1.6 Staged Gantt Chart



Straw “Float” Table

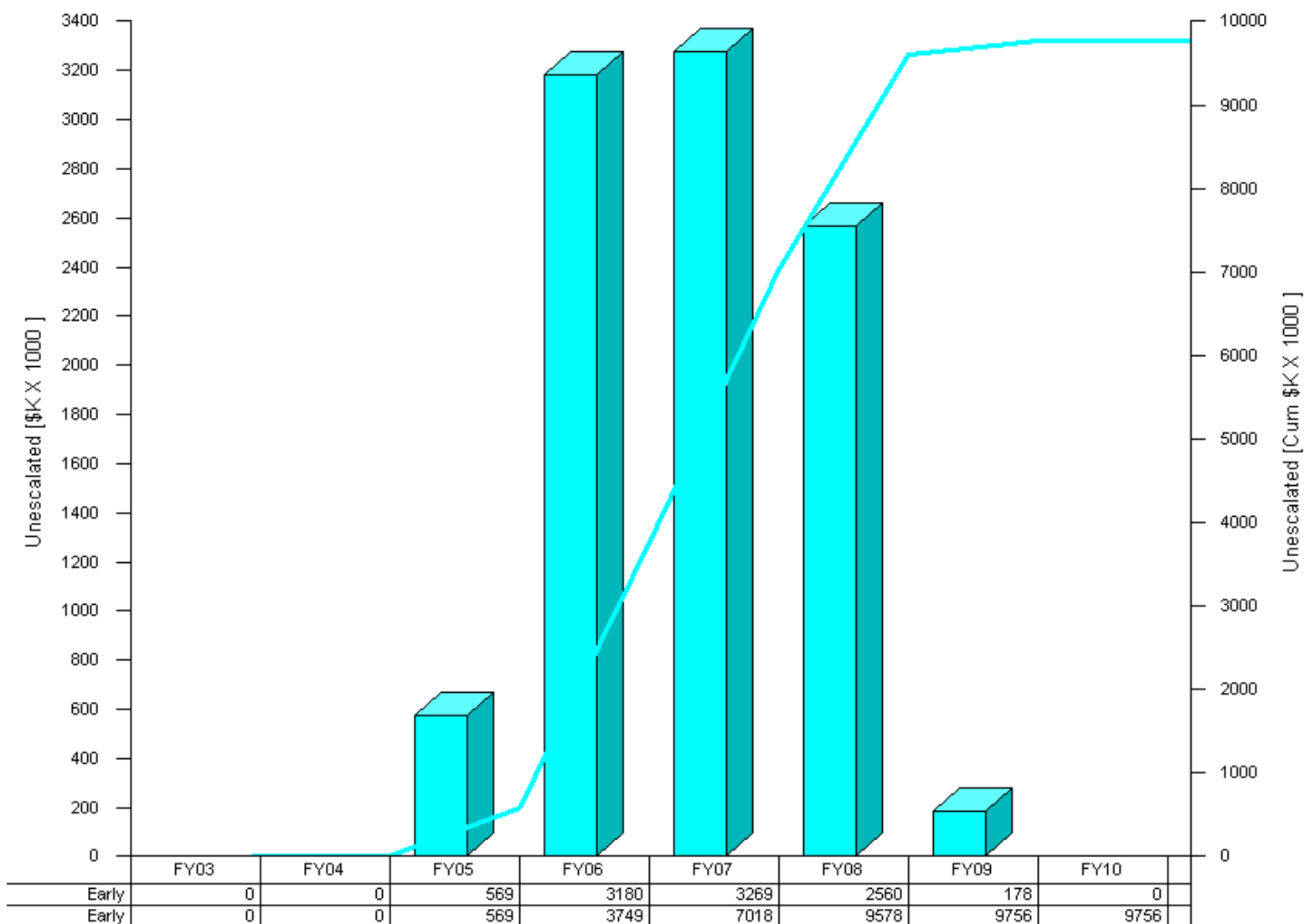
1	2	3	4	5	6
Station #	Lehman CD1 float	Current non-staged float	Current staged float	Straw Production Extended by 60 days	Twister Production extended by 75 days
1	266 d	373 d	nc	nc	nc
2	226 d	366 d	nc	nc	nc
3	396 d	364 d	549 d	nc	nc
4	281 d	357 d	542 d	nc	nc
5	46 d	347 d	nc	nc	nc
6	344 d	335 d	nc	nc	nc
7 U	124 d	352 d	nc	312 d	nc
7 V	124 d	289 d	nc	259 d	nc
7 X	124 d	218 d	nc	207 d	nc

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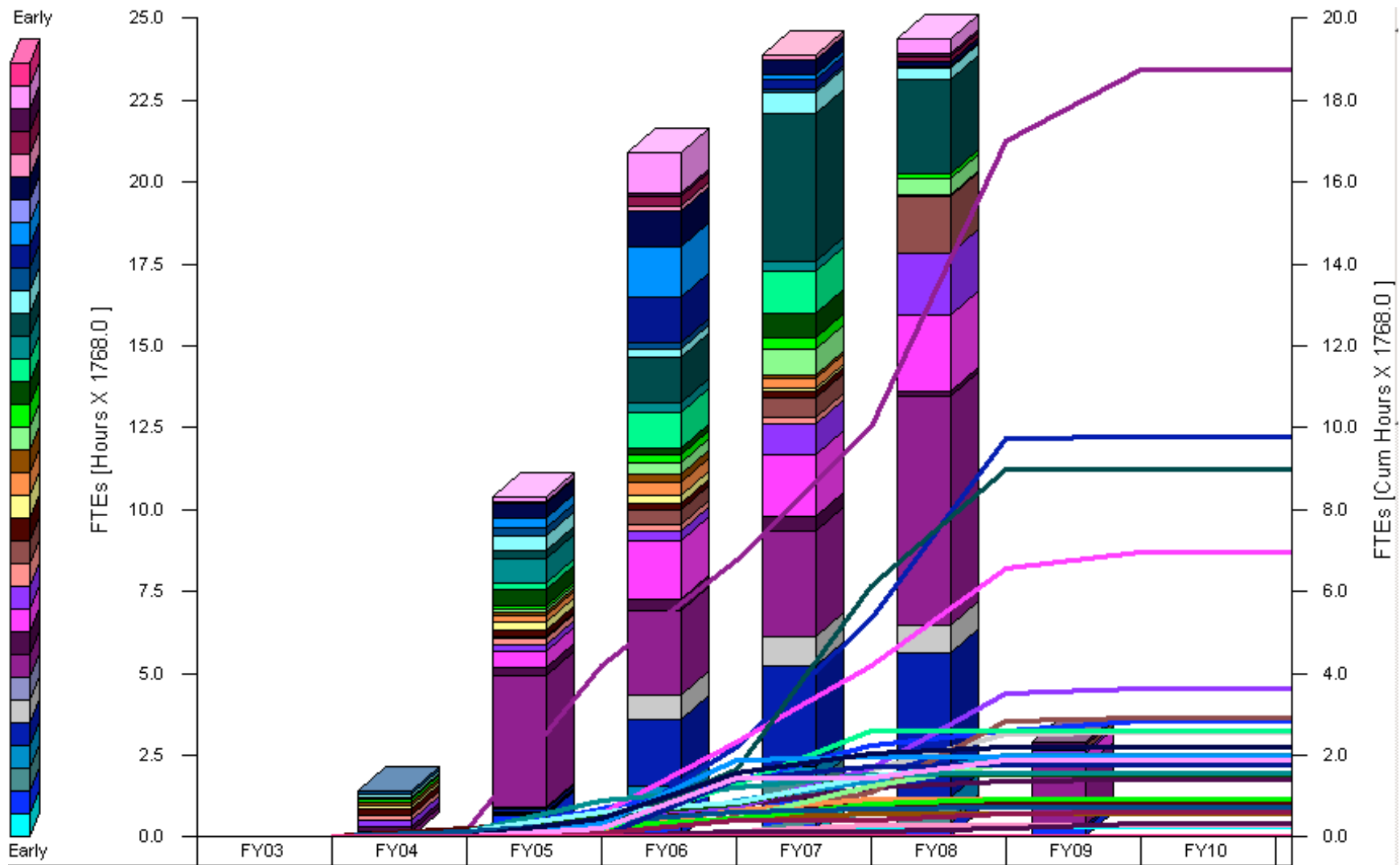
Costs vs FY

Activity ID	Activity Name	Base Cost(\$)	Material Contingency (%)	Labor Contingency (%)	Total FY05	Total FY06	Total FY07	Total FY08	Total FY09	Total FY05-09
1.6.1	Straw Chambers	6,076,045	23	29	198,401	2,702,277	2,618,657	2,075,863	53,672	7,648,869
1.6.2	Straw Detector Electronics	2,110,313	29	43	297,592	880,851	1,202,642	434,023	0	2,815,108
1.6.3	Mechanical Gas Calibration & Other Support Systems (FNAL SMU)	740,788	30	37	40,769	204,225	175,834	553,044	18,213	992,084
1.6.4	Integration & Testing (all)	271,383	31	71	130,235	101,553	65,853	41,698	31,739	371,078
1.6.5	Forward Tracker Straw Detector Subproject Management	560,945	30	30	150,030	152,421	150,627	150,627	125,523	729,228
1.6	Subproject 1.6	9,759,473	26	32	817,027	4,041,326	4,213,614	3,255,255	229,146	12,556,368

Cost vs FY (entire 1.6) (no contingency)



Labor Profile vs FY



- I have asked Dan Olis (L3 1.6.3), John Krider (L3 1.6.1), Walter Stuermer (L3 1.6.2) , and Youri Orlov (engineered S1-6 Installation fixture) to look carefully at the Straw Installation in order to minimize Installation time/station.
 - Includes the need for Survey time
 - We believe that we can install a station to an accuracy <4mm (one straw diameter), with tip and roll at acceptable levels.
 - Actual survey time estimated at 1/2 day station
 - Includes only “as found”
 - We believe we can get the time for installation down to 2-2.5 days/station.

Straw Response to Lehman CD1 Recommendations

1. Select the straw material, straw diameter, and wire diameter within this year. Clear work plan should be provided

- Agree
- We will acquire new Copperized Kapton Straws and subject them to radiation tests
- We will test 30 μm Anode wire
 - Currently use 25 μm wire
 - 30 μm is 50% stronger, but Voltage will be higher/
- Will setup a work plan.

2. Put Additional Effort into aging test

- Agree
- UH and UVa will test new straw materials (and anodes)
 - Will make setup with gas system similar to production system
- UH, UVa, and SMU have proposal to undertake Rad Damage test at IU cyclotron

3. Produce more prototypes (preferentially in all production sites) and test. They should be built with production components and tooling as much as possible

- Agree. This recommendation is consistent with our Station 3 HV prototype effort
 - All sites will produce consistent with their eventual production jobs
- UH, SMU, UVa Rad Damage test at IU cyclotron will also produce a prototype detector.

4. Move up production schedule by ~6 months.

- Lehman CD1 float was 46 days (~2 calendar months).
- By small rearrangement of dependencies between different activities, and production scheme, float can be made to be >200 days (10 calendar months), with relatively small impact on Cost profile.
- Is this “good” enough?

5. Strengthen management with a project engineer.

- Actually we do have project engineer(s) in management section of WBS
 - 0.5 FTE ME for project duration
 - 0.25 FTE EE for project duration
- I will propose to also add
 - Production Engineer
 - This will be a split of the 0.5 FTE ME into 2 people @0.25 FTE
 - Site (L4) Managers (= engineers?) for external sites
 - Propose ~10% FTE for duration of work at site
- Make this more obvious on my Org Chart!